In this module you will learn about:

- **Life-Threatening Conditions**: How to recognize and treat an airway obstruction, bleeding, and shock.

- **Triage**: Principles of triage and how to conduct triage evaluations.
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INTRODUCTION AND UNIT OVERVIEW

The need for CERTs to learn disaster medical operations is based on two assumptions:

- The number of victims could exceed the local capacity for treatment.
- Survivors will attempt to assist others. As CERT members you will need to know lifesaving first aid or post-disaster survival techniques.

CERT medical operations can play a vital role in limiting deaths from trauma. The phases of death from trauma are:

1. Phase 1: Death within minutes as a result of overwhelming and irreversible damage to vital organs

2. Phase 2: Death within several hours as a result of excessive bleeding

3. Phase 3: Death in several days or weeks as a result of infection or multiple-organ failure (i.e., complications from an injury)

These phases underlie why disaster medical operations are conducted as they are (by identifying those with the most serious injuries as soon as possible and treating those with life-threatening injuries first). Some disaster victims in the second and third phases of death could be saved by providing simple medical care.

In a disaster there may be more victims than rescuers, and assistance from medical professionals may not be immediately available. CERT personnel are trained to be part of disaster medical operations and to provide:

- Treatment for life-threatening conditions — airway obstruction, bleeding, and shock — and for other, less urgent conditions

- The greatest good for the greatest number of people by conducting simple triage and rapid treatment
START

Simple Triage And Rapid Treatment (START) is a critical concept for initially dealing with casualties in a disaster.

History has proven that 40% of disaster victims can be saved with simple (rapid!) medical care. START is based on the premise that a simple medical assessment and rapid treatment based on that assessment will yield positive — often lifesaving — results.

STart = Simple Triage: The first phase of START is the process by which victims are sorted based on injury and priority of treatment.

stART = And Rapid Treatment: The second phase of START consists of rapid treatment of the injuries assessed and prioritized in the first phase.

All CERT participants are encouraged to take basic first aid and CPR training; however, if you have taken first aid courses you will need to understand that CERT covers disaster medical operations where time is critical to conduct triage and treat many victims. CPR is not taught in this course because it is labor intensive and not appropriate when there are many victims and professional help will be delayed.

UNIT OBJECTIVES

At the end of this unit, you should be able to:

- Identify the “killers.”
- Apply techniques for opening the airway, controlling bleeding, and treating for shock.
- Conduct triage under simulated disaster conditions.

Remember, the goal of disaster medical operations is to do the greatest good for the greatest number. In a disaster with many victims, time will be critical. CERT members will need to work quickly and efficiently to help as many victims as possible.
UNIT TOPICS

This session will introduce you to the principles of triage, including treating the “three killers”: airway obstruction, excessive bleeding, and shock.

Throughout the unit, you will have opportunities to practice the treatment techniques and, at the end of the unit, you will have the opportunity to conduct triage evaluations in a simulated disaster.
TREating Life-Threatening Conditions

In emergency medicine, airway obstruction, bleeding, and shock are “killers” because without treatment they will lead to death. The first priority of medical operations is to attend to those potential killers by:

- Opening the airway
- Controlling excessive bleeding
- Treating for shock

This section will train you to recognize the “killers” by recognizing their symptoms and their effects on the body.

Approaching the Victim

Rescuers must first ensure that they are wearing safety equipment:

- Helmet
- Goggles
- Gloves
- N95 mask
- Sturdy shoes or boots
- Non-latex exam gloves

A good time-saving technique is to wear non-latex exam gloves under your work gloves. Then, when you find a victim, you can remove your work gloves and are ready to work with the victim.

Remember to use non-latex exam gloves to prevent potential reaction by individuals who are allergic to latex.
TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

There are several steps to take when approaching a victim. When ready to approach a victim:

1. If the victim is conscious, be sure he or she can see you.

2. Identify yourself by giving your name and indicating the organization with which you are affiliated.

3. ALWAYS request permission to treat an individual. If the individual is unconscious, he or she is assumed to have given “implied consent,” and you may treat him or her. Ask a parent or guardian for permission to treat a child, if possible.

4. Whenever possible, respect cultural differences. For example, in some Muslim traditions it is customary to address the male when requesting permission to treat a female member of his family.

5. Remember, all medical patients are legally entitled to confidentiality (HIPAA). When dealing with victims, always be mindful and respectful of the privacy of their medical condition.

OPENING THE AIRWAY

The respiratory system includes the following components:

- Lung
- Bronchus
- Larynx
- Pharynx
- Nasal Cavity
- Trachea

In an unconscious or semiconscious victim, especially one positioned on his or her back, the most common airway obstruction is the tongue. The tongue — which is a muscle — may relax and block the airway. A victim with a suspected airway obstruction must be checked immediately for breathing and, if necessary, the airway must be opened.
Airway Obstructed by the Tongue

Conscious

Unconscious
TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

THE HEAD-TILT/CHIN-LIFT METHOD

When an airway obstruction is suspected because a victim is unconscious or semiconscious, CERT members should clear the airway using the Head-Tilt/Chin-Lift method.

In addition to opening the airway, this method causes little or no cervical-spine manipulation because only the head is manipulated.

Proper technique is always important in opening an airway, but so is speed.

### Head-Tilt/Chin-Lift Method for Opening an Airway

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At an arm’s distance, make contact with the victim by touching the shoulder and asking, “Can you hear me?” Speak loudly, but do not yell.</td>
</tr>
<tr>
<td>2</td>
<td>If the victim does not or cannot respond, place the palm of one hand on the forehead.</td>
</tr>
<tr>
<td>3</td>
<td>Place two fingers of the other hand under the chin and tilt the jaw upward while tilting the head back slightly.</td>
</tr>
<tr>
<td>4</td>
<td>Place your ear close to the victim’s mouth, looking toward the victim’s feet, and place a hand on the victim’s abdomen.</td>
</tr>
<tr>
<td>5</td>
<td>Look for chest rise.</td>
</tr>
</tbody>
</table>
| 6    | Listen for air exchange.  
  ▪ Document abnormal lung sounds (wheezing, gasping, gurgling, etc.). |
| 7    | Feel for abdominal movement. |
| 8    | If breathing has been restored, the clear airway must be maintained by keeping the head tilted back. If breathing has not been restored, repeat steps 2-7. |
TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

EXERCISE: OPENING THE AIRWAY

Purpose: Practice using the Head-Tilt/Chin-Lift method of opening the airway.

Be sure to use the steps in the Head-Tilt/Chin-Lift method.

MAINTAINING THE AIRWAY

If breathing has been restored, the clear airway still must be maintained by keeping the head tilted back. One option is to ask another person to hold the head in place; even another victim with minor injuries could do this. The airway also can be maintained by placing soft objects under the victim’s shoulders to elevate the shoulders slightly and keep the airway open.

Remember that part of your mission is to do the greatest good for the greatest number of people. For that reason, if breathing is not restored on the first try using the Head-Tilt/Chin-Lift method, CERT members should try again using the same method. If breathing cannot be restored on the second try, CERT members must move on to the next victim.

You should always be concerned with head, neck, or spinal injuries (all of which are common in structural collapses). Used properly, the Head-Tilt/Chin-Lift method for opening an airway causes little spinal manipulation because the head pivots on the spine.

Remember the importance of opening the airway as quickly as possible. When treating the three killers, checking for airway obstruction is always first.
TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

CONTROLLING BLEEDING

Uncontrolled bleeding initially causes weakness. If bleeding is not controlled, the victim will go into shock within a short period of time and finally will die. An adult has about 5 liters of blood. Losing 1 liter can result in death.

There are three types of bleeding and the type can usually be identified by how fast the blood flows:

- **Arterial bleeding.** Arteries transport blood under high pressure. Blood coming from an artery will spurt.

- **Venous bleeding.** Veins transport blood under low pressure. Blood coming from a vein will flow.

- **Capillary bleeding.** Capillaries also carry blood under low pressure. Blood coming from capillaries will ooze.

There are three main methods for controlling bleeding:

- Direct pressure
- Elevation
- Pressure points

Direct pressure and elevation will control bleeding in 95% of cases.
# Procedures for Controlling Bleeding

<table>
<thead>
<tr>
<th>Method</th>
<th>Procedures</th>
</tr>
</thead>
</table>
| Direct Pressure | ▪ Place direct pressure over the wound by putting a clean dressing over the wound and pressing firmly.  
▪ Maintain pressure on the dressing over the wound by wrapping the wound *firmly* with a pressure bandage and tying with a bow. |
| Elevation       | ▪ Elevate the wound above the level of the heart.                             |
| Pressure Points | ▪ Put pressure on the nearest pressure point to slow the flow of blood to the wound. Use the:  
▪ Brachial point for bleeding in the arm  
▪ Femoral point for bleeding in the leg  
▪ Popliteal point for bleeding in the lower leg |
TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

DIRECT PRESSURE

This is the procedure for controlling bleeding through direct pressure:

- **Step 1:** Place direct pressure over the wound by putting a clean dressing over it and pressing firmly.
- **Step 2:** Maintain pressure on the dressing over the wound by wrapping **firmly** with a bandage.

Direct pressure and elevation can take 5 to 7 minutes to stop the bleeding completely. The use of a dressing and pressure bandage allows the rescuer to move on to the next victim.

A pressure bandage should be tied with a bow, so that it can be loosened — rather than cut — to examine the wound, and then retied. This procedure helps to conserve supplies and saves time. The bandage maintains the direct pressure needed to stop the bleeding. CERT members continue to assess the victim’s status. If the victim’s limb is turning blue or becoming numb below the bandage, then it should be loosened.

ELEVATION

Elevation can be used in combination with direct pressure. Elevate the wound above the level of the heart.

The body has great difficulty pumping blood against gravity; therefore, elevating a wound above the heart will decrease blood flow and loss of blood through the wound.

PRESSURE POINTS

There are also pressure points that can be used to stem the flow of bleeding.

The pressure points most often used are the:

- Brachial point in the arm
- Femoral point in the leg
- Pressure point behind the knee

The pressure point to use depends on the location of the wound. The correct pressure point is between the wound and the heart.
METHODS FOR CONTROLLING BLEEDING

Brachial Pressure Point
just above the elbow

Femoral Pressure Point
in the Upper thigh

Popliteal Pressure Point
behind the knee
TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

EXERCISE: CONTROLLING BLEEDING

Purpose: This exercise will provide a chance to practice using the techniques for controlling bleeding.

Instructions:

1. After breaking into pairs, identify one person to take the role of the victim.
2. Respond as if the victim has an injury on the right forearm, just below the elbow.
3. Apply a pressure bandage and elevate the arm.
4. Repeat the process twice.
5. Swap roles and have the new rescuer complete the above steps.

TOURNIQUETS (OPTIONAL)

CERTs will use direct pressure on pressure points and elevation to manage most bleeding. However, if bleeding cannot be stopped using these methods and professionals are delayed in responding, a tourniquet may be a viable option to save a person from bleeding to death. However, a tourniquet is absolutely a last resort (life or limb) when other preferred means have failed to control bleeding in an arm or a leg.

While the use of a tourniquet is extremely rare, it may have a use when part of an extremity is amputated or crushed and bleeding cannot be stopped by any other preferred means.

- A tourniquet is a tight bandage which, when placed around a limb and tightened, cuts off the blood supply to the part of the limb beyond it.
- A tourniquet can do harm to the limb, but it can halt severe blood loss when all other means have failed and professional help will not arrive in time to help stop the bleeding before the person dies.
- Use any long, flat, soft material (bandage, neck tie, belt, or stocking). Do not use materials like rope, wire, or string that can cut into the patient’s flesh.
TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

- To tie a tourniquet:

1. Place the tourniquet between the wound and the heart (for example, if the wound is on the wrist, you would tie the tourniquet around the forearm).

2. Tie the piece of material around the limb.

3. Place a stick, pen, ruler, or other sturdy item against the material and tie a knot around the item, so that the item is knotted against the limb.

4. Use the stick or other item as a lever to twist the knot more tightly against the limb, tightening the bandage until the bleeding stops.

5. Tie one or both ends of the lever against the limb to secure it and maintain pressure.

6. Mark the patient in an obvious way that indicates that a tourniquet was used and include the time it was applied.

7. Do not loosen a tourniquet once it has been applied.

8. Only proper medical authorities should remove a tourniquet.

CONTROLLING BLEEDING REVIEW

The three main ways to control excessive bleeding:

- Direct pressure
- Elevation
- Pressure points

Bleeding must be controlled as quickly as possible so as not to endanger the victim’s life from blood loss.

You should always wear your non-latex exam gloves, goggles, and an N95 mask as a protection against blood-borne pathogens, such as hepatitis and HIV.
TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

Shock is a condition that occurs when the body is not getting enough blood flow. When blood doesn't circulate, oxygen and other nutrients are not carried to tissues and organs. Blood vessels begin to close and organs are damaged and, if left untreated, will shut down completely. Shock can worsen very rapidly.

Remaining in shock will lead to the death of:
- Cells
- Tissues
- Entire organs

The main signs of shock that CERT members should look for are:
- Rapid and shallow breathing
- Capillary refill of greater than 2 seconds
- Failure to follow simple commands, such as “Squeeze my hand”

EVALUATE BREATHING

Note if the victim’s breathing is rapid and shallow, i.e., more than 30 breaths per minute.

EVALUATE CIRCULATION

One way to test for circulation is the blanch test. A good place to do the blanch test is the palm of one hand. Sometimes, a nail bed is used. The blanch test is used to test capillary refill. You should see the color return to the tested area within 2 seconds.

Because the blanch test is not valid in children, mental status should be used instead as the main indicator.

Another way to check for circulation is the radial pulse test. This is an alternative to the blanch test and can be used in the dark or where it is cold.

To perform the radial pulse test, place your middle and ring finger over the interior of the victim’s wrist where the thumb meets the arm. A normal pulse rate is 30-60 beats per minute.
TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

EVALUATE MENTAL STATUS

There are several ways to evaluate mental status.

▪ Ask, “Are you okay?”

▪ Give a simple command such as “Squeeze my hand.”

If you are concerned that there might be a language barrier or hearing impairment, reach out with both hands and squeeze one of the victim’s hands. The person will squeeze back if they can.

TREATING FOR SHOCK

The body will initially compensate for blood loss and mask the symptoms of shock; therefore, shock is often difficult to diagnose. It is possible — and, in fact, common — for an individual suffering from shock to be fully coherent and not complaining of pain. Pay attention to subtle clues, as failure to recognize shock will have serious consequences.

Avoid rough or excessive handling. It is important to maintain the victim’s body temperature. If necessary, place a blanket or other material under and/or over the victim to provide protection from extreme ground temperatures (hot or cold). Position the victim on his or her back and elevate the feet 6 to 10 inches above the level of the heart to assist in bringing blood to the vital organs.

Although victims who are suffering from shock may be thirsty, they should not eat or drink anything initially because they may also be nauseated.
## Procedures for Controlling Shock

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maintain an open airway.</td>
</tr>
<tr>
<td>2</td>
<td>Control obvious bleeding.</td>
</tr>
<tr>
<td>3</td>
<td>Maintain body temperature (e.g., cover the ground and the victim with a blanket if necessary).</td>
</tr>
</tbody>
</table>

**Notes**
- Avoid rough or excessive handling.
- Do not provide food or drink.
TREATING LIFE-THREATENING CONDITIONS (CONTINUED)

EXERCISE: TREATING SHOCK

Purpose: This exercise offers you a chance to practice the steps for treating shock.

Instructions:

1. Break into the previous groups.

2. The person who was the victim first in the previous exercise will now be the rescuer first.

3. Pretend that you are in the following situation:

   - You have come upon an unconscious victim who has been bleeding profusely from a wound of the upper arm for an undetermined period of time. You have controlled the bleeding.

   - What do you need to do next?

4. Switch places and have the victim become the rescuer.
Triage

In mass casualty events, medical personnel:

- Identify the dead and those who are too severely injured to be saved
- Send those with relatively minor injuries and wounds to a holding area to await treatment
- Identify those who would die from life-threatening injuries and treat them immediately

The term for this is triage — a French term meaning “to sort.”

During medical triage, victims’ conditions are evaluated and the victims are prioritized into four categories:

- Immediate (I): The victim has life-threatening injuries (airway, bleeding, or shock) that demand immediate attention to save his or her life; rapid, lifesaving treatment is urgent. These victims are marked with a red tag or labeled “I.”
- Delayed (D): Injuries do not jeopardize the victim’s life. The victim may require professional care, but treatment can be delayed. These victims are marked with a yellow tag or labeled “D.”
- Minor (M): Walking wounded and generally ambulatory. These victims are marked with a green tag or labeled “M.”
- Dead (DEAD): No respiration after two attempts to open the airway. Because CPR is one-on-one care and is labor intensive, CPR is not performed when there are many more victims than rescuers. These victims are marked with a black tag or labeled “DEAD.”
TRIAGE (CONTINUED)

From triage, victims are taken to the designated medical treatment area (immediate care, delayed care, or the morgue).

CERT members do not rescue those tagged DEAD. If the scene is deemed safe and it is appropriate to do so, CERT members may move the DEAD to the morgue.

It is crucial to the physical and mental well-being of disaster survivors that the morgue be placed away from the other groups. Traditionally, blue tarps are used to identify and conceal the morgue area.

RESCUER SAFETY DURING TRIAGE

If hazardous materials are present, rescuer safety is paramount. CERT members should leave the scene to avoid harm to themselves and to reduce the risk of spreading the contamination.

Rescuer safety is crucial during triage. Rescuers must wear all safety equipment, including non-latex exam gloves, goggles, a helmet, and an N95 mask when examining victims and should try to change gloves between victims. Because of limited supplies, it may not be possible to use a new pair of gloves for every victim. If this is the case, gloves may be sterilized between treating victims using 1 part bleach to 10 parts water. Your disaster kit should have a box of non-latex gloves. Bleach and potable water should also be available at the CERT’s medical treatment area.

EXERCISE: REMOVING EXAM GLOVES

PURPOSE: This exercise will allow you to practice proper technique for removing soiled exam gloves without spreading contaminants.

INSTRUCTIONS:

1. Put on a pair of gloves.

2. Remove and dispose of your gloves as instructed.
COMMUNITY EMERGENCY RESPONSE TEAM
UNIT 3: DISASTER MEDICAL OPERATIONS — PART 1

TRIAGE (CONTINUED)

TRIAGE IN A DISASTER ENVIRONMENT

Here is the general procedure for CERTs to conduct triage:

- **Step 1:** Stop, Look, Listen, and Think. Before your team starts, stop and size up the situation by looking around and listening. Think about your safety, capability, and limitations, and decide if you will approach the situation. If you decide to proceed, quickly make a plan about your approach that all members understand.

- **Step 2:** Conduct voice triage. Begin by calling out, “Community Emergency Response Team. If you can walk, come to the sound of my voice.” Speak loudly and firmly. If there are survivors who are ambulatory, tag them M and direct them to a designated location. If rescuers need assistance and there are ambulatory survivors, then these survivors should be asked to provide assistance. These persons may also provide useful information about the location of the victims.

- **Step 3:** Start where you stand, and follow a systematic route. Start with the closest victims and work outward in a systematic fashion.

- **Step 4:** Evaluate each victim and tag them “I” (immediate), “D” (delayed), “M” (minor), or DEAD. Remember to evaluate the walking wounded. Remember to ASK for permission to treat if the individual is conscious.

- **Step 5:** Treat I victims immediately. Initiate airway management, bleeding control, and/or treatment for shock for Category I victims.

- **Step 6:** Document triage results for:
  - Effective deployment of resources
  - Information on the victims’ locations
  - A quick record of the number of casualties by degree of severity.

Remember that your safety is paramount during triage. It is important to wear proper protective equipment so as not to endanger your own health.
## EVALUATING A VICTIM DURING TRIAGE

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedures</th>
</tr>
</thead>
</table>
| 1    | Check airway/breathing. At an arm’s distance, make contact with the victim and speak loudly. If the victim does not respond:  
  - Position the airway.  
  - Look, listen, and feel.  
  - Check breathing rate. Abnormally rapid respiration (above 30 per minute) indicates shock. Maintain the airway and treat for shock and tag “I.”  
  - If below 30 per minute, then move to Step 2.  
  - If the victim is not breathing after two attempts to open airway, then tag “DEAD.” |
| 2    | Check circulation/bleeding.  
  - Take immediate action to control severe bleeding.  
  - Check circulation using the blanch test (for capillary refill) or a radial pulse test.  
    - Press on an area of skin until normal skin color is gone. Time how long it takes for normal color to return. Treat for shock if normal color takes longer than 2 seconds to return, and tag “I.”  
    - Or check the radial pulse.  
      - If present, continue to step 3.  
      - Note if the pulse is abnormal (rapid, thready, weak, etc.)  
      - If absent, tag “I” and treat for bleeding and shock. |
| 3    | Check mental status. Inability to respond indicates that immediate treatment for shock is necessary. Treat for shock and tag “I.” |
Sample Triage Documentation

<table>
<thead>
<tr>
<th>Status</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>M</td>
<td>10</td>
<td>11</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Dead</td>
<td>3</td>
<td>7</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
EVALUATING A VICTIM DURING TRIAGE (CONTINUED)

Time will be critical in a disaster. You will not be able to spend very much time with any single victim. Remember that you want to do the greatest good for the greatest number of victims.

In order to respond effectively in a mass casualty event CERT members must:

- Have a plan based on a thorough sizeup
- Follow that plan
- Document actions throughout

Triage must be practiced to avoid triage pitfalls. Triage pitfalls include:

- No team plan, organization, or goal
- Indecisive leadership
- Too much focus on one injury
- Treatment (rather than triage) performed
The triage decision flowchart shows the three steps in the triage process.  
**Step 1:** Assess and position the airway and check breathing.  
**Step 2:** Check circulation and control bleeding.  
**Step 3:** Check mental status.
EVALUATING A VICTIM DURING TRIAGE (CONTINUED)

EXERCISE: CONDUCTING TRIAGE

Purpose: This exercise will allow you to practice conducting triage in a high pressure situation.

Instructions:

1. Divide into three groups. Tape your medical status card to your shirt.

2. There will be three rounds. In each round, one group will be rescuers and the other two will be victims.

3. The rescuers will have a limited amount of time to:
   - Size up the situation and develop a plan of action
   - Conduct triage and tag each victim for treatment
   - Document the number of victims in each category of triage (Immediate, Delayed, Minor, Dead)
UNIT SUMMARY

- CERT members’ ability to open airways, control bleeding, and treat shock is critical to saving lives.
  - Use the Head-Tilt/Chin-Lift method for opening airways.
  - Control bleeding using direct pressure, elevation, and/or pressure points.
  - If there is a question about whether a victim is in shock, treat for shock as a precaution.

- Triage is a system for rapidly evaluating victims’ injuries and prioritizing them for treatment.
  - There are 4 triage categories:
    1. Immediate
    2. Delayed
    3. Minor
    4. Dead

- Triage in a disaster environment consists of 6 important steps:
  1. Stop, Look, Listen and Think, and make a quick plan.
  2. Conduct voice triage.
  3. Begin where you stand and work systematically.
  4. Evaluate and tag all victims.
  5. Treat those tagged "I" immediately.
  6. Document your findings.
UNIT SUMMARY (CONTINUED)

- The procedure for conducting triage evaluations involves checking:
  - The airway and breathing rate
  - Circulation and bleeding
  - Mental status

HOMEWORK ASSIGNMENT

Read and become familiar with Unit 4: Disaster Medical Operations — Part 2 before the next session.

Remember to bring a blanket, roller gauze, adhesive tape, duct tape, and cardboard to the next session.
UNIT 4: DISASTER MEDICAL OPERATIONS — PART 2

In this unit you will learn about:

- **Public Health Considerations:** How to maintain hygiene and sanitation.
- **Functions of Disaster Medical Operations:** What the five major functions of disaster medical operations are and how they are set up.
- **Disaster Medical Treatment Areas:** How to establish them and what their functions are.
- **Patient Evaluation:** How to perform a head-to-toe assessment to identify and treat injuries.
- **Basic Treatment—How to:**
  - Treat burns
  - Dress and bandage wounds
  - Treat fractures, dislocations, sprains, and strains
  - Treat hypothermia
  - Treat heat-related injuries
  - Control nasal bleeding
  - Treat bites and stings
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INTRODUCTION AND UNIT OVERVIEW

UNIT OBJECTIVES

At the end of this unit, you should be able to:

 Take appropriate sanitation measures to protect public health.
 Perform head-to-toe patient assessments.
 Establish a treatment area.
 Apply splints to suspected fractures and sprains
 Employ basic treatments for other injuries

UNIT TOPICS

The unit topics are:

 Public Health Considerations
 Functions of Disaster Medical Operations
 Establishing Medical Treatment Areas
 Conducting Head-to-Toe Assessments
 Treating Burns
 Wound Care
 Treating Fractures, Dislocations, Sprains, and Strains
 Nasal Injuries
 Treating Cold-Related Injuries
 Treating Heat-Related Injuries
 Bites and Stings
PUBLIC HEALTH CONSIDERATIONS

When disaster victims are sheltered together for treatment, public health becomes a concern. Measures must be taken, both by individual CERT members and CERT operations, to avoid the spread of disease.

The primary public health measures include:

- Maintaining proper hygiene
- Maintaining proper sanitation
- Purifying water (if necessary)
- Preventing the spread of disease

MAINTAINING HYGIENE

Maintenance of proper personal hygiene is critical even under makeshift conditions.

Some steps that individuals should take to maintain hygiene are to:

- **Wash hands frequently** using soap and water. Hand washing should be thorough (at least 15 to 20 seconds of vigorous rubbing on all surfaces of the hand).

  Alcohol-based hand sanitizers — which don’t require water — are a good alternative to hand washing. The Centers for Disease Control (CDC) recommends products that are at least 60% alcohol. To use an alcohol-based hand sanitizer, apply about ½ teaspoon of the product to the palm of your hand. Rub your hands together, covering all surfaces, until hands are dry.

- **Wear non-latex exam gloves at all times.** Change or disinfect gloves after examining and/or treating each patient. As explained earlier, under field conditions, individuals can use rubber gloves that are sterilized between treating victims using bleach and water (1 part bleach to 10 parts water).

- **Wear an N95 mask and goggles.**

- **Keep dressings sterile.** Do not remove the overwrap from dressings until use. After opening, use the entire package of dressing, if possible.

- **Thoroughly wash areas that come in contact with body fluids** with soap and water or diluted bleach as soon as possible.
PUBLIC HEALTH CONSIDERATIONS (CONTINUED)

MAINTAINING SANITATION

Poor sanitation is also a major cause of infection. CERT medical operations personnel can maintain sanitary conditions by:

- Controlling the disposal of bacterial sources (e.g., soiled exam gloves, dressings, etc.)
- Putting waste products in plastic bags, tying off the bags, and marking them as medical waste. Keep medical waste separate from other trash, and dispose of it as hazardous waste.
- Burying human waste. Select a burial site away from the operations area and mark the burial site for later cleanup.

WATER PURIFICATION

Potable water supplies are often in short supply or are not available in a disaster. Water can be purified for drinking, cooking, and medical use by heating it to a rolling boil for 1 minute or by using water purification tablets or non-perfumed liquid bleach.

The bleach to water ratios are:

- 8 drops of bleach per gallon of water
- 16 drops per gallon of water, if the water is cloudy or dirty

Let the bleach and water solution stand for 30 minutes. Note that if the solution does not smell or taste of bleach, add another six drops of bleach, and let the solution stand for 15 minutes before using.

Rescuers should not put anything on wounds other than purified water. The use of other solutions (e.g., hydrogen peroxide) on wounds must be the decision of trained medical personnel.

PREVENTING THE SPREAD OF DISEASE

CERT members must use non-latex exam gloves, goggles, and an N95 mask during all medical operations. Cover all open wounds as a way of preventing the spread of infection.
FUNCTIONS OF DISASTER MEDICAL OPERATIONS

There are five major functions of disaster medical operations:

- **Triage**: The initial assessment and sorting of victims for treatment based on the severity of their injuries
- **Treatment**: The disaster medical services provided to victims
- **Transport**: The movement of victims from incident location to the treatment area
- **Morgue**: The temporary holding area for victims who have died at the treatment area. Those who are tagged as “Dead” during triage are not removed from the incident site.
- **Supply**: The hub for crucial supply procurement and distribution
Disaster Medical Operations Organization showing the functions of disaster medical operations: Triage, Transport, Treatment, Morgue, and Supply.
ESTABLISHING MEDICAL TREATMENT AREAS

Because time is critical when CERTs activate, CERT medical operations personnel will need to select a site and set up a treatment area as soon as injured victims are confirmed.

Determining the best location(s) for the CERT treatment area should include the following overall considerations:

- Safety for rescuers and victims
- Most effective use of resources, e.g., CERT members themselves, time, medical supplies

SAFETY FOR RESCUERS AND VICTIMS

As victims are located, rescued, and triaged, they are moved to a location where they can be treated. The severity of the damage and the safety of the immediate environment determine where the initial CERT treatment area should be located. In all cases, remember that your safety is the number one priority.

- In structures with light damage, CERT members triage the victims as they are located. Further medical treatment is performed in a safe location inside the structure where victims are organized according to the extent of their injuries.

- In structures with moderate damage, CERT members also triage the victims as they are located; however, victims are sent to a medical treatment location that is a safe distance from the incident location. Victims are organized according to the extent of their injuries.

Whether the treatment area is set up inside or a safe distance from the structure, a morgue may need to be set up as a temporary holding area for victims who die at the treatment area.
ESTABLISHING MEDICAL TREATMENT AREAS (CONTINUED)

In addition to the severity of the damage to the structure where victims are found, there are two other important safety considerations:

- The treatment area itself must be free of hazards and debris.
- The site should be close to but uphill and upwind from the hazard zone.

MOST EFFECTIVE USE OF CERT RESOURCES

In addition to the safety of rescuers and victims, a second overall consideration for setting up treatment areas is how to make the best use of CERT resources, e.g., CERT members themselves, time, medical supplies, and equipment.

To help meet the challenge of limited resources, particularly if initial treatment operations will continue for some time, CERT may need decentralized treatment locations and/or may establish one central medical treatment location, depending on the circumstances. The CERT may need to include one or both in their medical operations plan:

- Decentralized Treatment Sites: In a widespread event with many injured, it is sometimes necessary to set up and maintain more than one medical treatment location, especially when a central treatment location would be a considerable distance from the initial treatment site.
  - A medical treatment location would be set up close to, but a safe distance from, each of the damage sites. Each of the treatment locations would include areas for Immediate, Delayed, and Minor victims and a morgue.
  - Victims remain under treatment at the location until they can be transported to a location for professional medical care or to the CERT's main treatment area.
ESTABLISHING MEDICAL TREATMENT AREAS (CONTINUED)

- Centralized Treatment Site: In an event with one or a few injured victims at each of a number of sites, the CERT may need to establish one central medical treatment location. A centralized location may need to be set up even when there are decentralized sites established.
  
  - The location would include treatment areas for Immediate, Delayed, and Minor victims, and a morgue.
  
  - Victims are moved from where they were rescued, triaged, and initially treated to the central location, and remain under treatment there until they can be transported to a location for professional medical treatment.
  
  - A central medical treatment location allows for effective use of resources since a limited number of CERT medical operation personnel in one location can take care of a greater number of victims.
  
  - EMS or other medical professionals will generally be able to transport the injured more efficiently from one central location than from multiple decentralized locations.

- Whether a treatment site is centralized or one of a number of decentralized sites, the location(s) selected should be:
  
  - Accessible by transportation vehicles (ambulances, trucks, helicopters, etc.)
  
  - Expandable
Treatment Area Site Selection

The treatment area must be protected and clearly delineated. Signs should be used to identify the subdivisions of the area:

- “I” for Immediate care
- “D” for Delayed care
- “M” for Minor injuries/walking wounded
- “DEAD” for the morgue

TREATMENT AREA LAYOUT

The treatment site should be uphill and upwind from the hazard.

The treatment area must be protected and clearly delineated. Signs should be used to identify the subdivisions of the area:

- “I” for Immediate care
- “D” for Delayed care
- “M” for Minor injuries/walking wounded
- “DEAD” for the morgue
Establishing Medical Treatment Areas (Continued)

The “I” and “D” areas should be relatively close to each other to allow:

- Verbal communication between workers in the treatment areas
- Shared access to medical supplies (which should be cached in a central location)
- Easy transfer of patients whose status has changed

Victims who have been identified with minor injuries may choose to stay at the treatment area or leave. If they stay, they can assist CERT personnel. If they leave, it should be documented.

Patients in the treatment area should be positioned in a head-to-toe configuration, with 2 to 3 feet between victims.

This system will provide:

- Effective use of space
- Effective use of available personnel. As a team member finishes one head-to-toe assessment, he or she turns around and is at the head of the next patient.

The morgue site should be secure, away from and not visible from the treatment area. This will help minimize traffic near the area and reduce the potential psychological impact on those in the treatment area.

Pre-planning for CERT medical operations includes equipment needed to set up the treatment area, such as ground covers or tarps and signs for identifying divisions (“I”, “D”, “M”, “DEAD”).
The distance shown between the Incident Site/Triage and the Treatment Area will depend on whether or not the treatment location is site specific or more centralized in the CERT’s service area.
ESTABLISHING MEDICAL TREATMENT AREAS (CONTINUED)

TREATMENT AREA ORGANIZATION

There is an obvious need for planning before disaster strikes, including roles of personnel assigned to the treatment area. The CERT must assign leaders to maintain control in each of the medical treatment area subdivisions. These leaders will:

- Ensure orderly victim placement
- Direct team members to conduct head-to-toe assessments

It is very important to thoroughly document the victims in the treatment area, including:

- Name, address, and phone number if victim is able to talk
- Description (age, sex, body build, estimated height)
- Clothing
- Injuries
- Treatment
- Transfer location
CONDUCTING HEAD-TO-TOE ASSESSMENTS

The first steps that you will take when working with a victim will be to conduct triage and rapid treatment. After all victims in an area have been triaged and moved to a medical treatment area, CERT members will begin a thorough head-to-toe assessment of each victim’s condition.

During triage, you are keeping an eye out for “the killers”:

- Airway obstruction
- Excessive bleeding
- Signs of shock

A head-to-toe assessment goes beyond the “killers” to try to gain more information to determine the nature of the victim’s injury. The entire assessment must be performed before initiating treatment.

OBJECTIVES OF HEAD-TO-TOE ASSESSMENTS

The objectives of a head-to-toe assessment are to:

- Determine, as clearly as possible, the extent of injuries
- Determine what type of treatment is needed
- Document injuries

Remember to always wear your safety equipment when conducting head-to-toe assessments.
CONDUCTING HEAD-TO-TOE ASSESSMENTS (CONTINUED)

WHAT TO LOOK FOR IN HEAD-TO-TOE ASSESSMENTS

The medical community uses the acronym DCAP-BTLS to remember what to look for when conducting a rapid assessment. DCAP-BTLS stands for the following:

- Deformities
- Contusions (bruising)
- Abrasions
- Punctures
- Burns
- Tenderness
- Lacerations
- Swelling

When conducting a head-to-toe assessment, CERT members should look for DCAP-BTLS in all parts of the body.

Remember to provide IMMEDIATE treatment for life-threatening injuries.

You should pay careful attention to how people have been hurt (the mechanism of injury) because it provides insight to probable injuries suffered.
CONDUCTING HEAD-TO-TOE ASSESSMENTS (CONTINUED)

HOW TO CONDUCT A HEAD-TO-TOE ASSESSMENT

Whenever possible, ask the person about any injuries, pain, bleeding, or other symptoms. If the victim is conscious, CERT members should always ask permission to conduct the assessment. The victim has the right to refuse treatment. Talking with the conscious patient reduces anxiety.

Head-to-toe assessments should be:

- Conducted on all victims, even those who seem all right
- Verbal (if the patient is able to speak)
- Hands-on. Do not be afraid to remove clothing to look.

It is very important that you conduct head-to-toe assessments systematically; doing so will make the procedure quicker and more accurate with each assessment. Remember to:

- Pay careful attention
- Look, listen, and feel for anything unusual
- Suspect a spinal injury in all unconscious victims and treat accordingly

Remember to check your own hands for patient bleeding as you perform the head-to-toe assessment.
CONDUCTING HEAD-TO-TOE ASSESSMENTS (CONTINUED)

Check body parts from the top to the bottom for continuity of bones and soft tissue injuries (DCAP-BTLS) in the following order:

1. Head
2. Neck
3. Shoulders
4. Chest
5. Arms
6. Abdomen
7. Pelvis
8. Legs

While conducting a head-to-toe assessment, CERT members should always check for:

- PMS (Pulse, Movement, Sensation) in all extremities
- Medical ID emblems on bracelet or on neck chain

CLOSED-HEAD, NECK, AND SPINAL INJURIES

When conducting head-to-toe assessments, rescuers may come across victims who have or may have suffered closed-head, neck, or spinal injuries.

A closed-head injury for the participants is a concussion-type injury, as opposed to a laceration, although lacerations can be an indication that the victim has suffered a closed-head injury.

The main objective when CERT members encounter suspected injuries to the head or spine is to do no harm. Minimize movement of the head and spine while treating any other life-threatening conditions.
Signs of a Closed-Head, Neck, or Spinal Injury

The signs of a closed-head, neck, or spinal injury most often include:

- Change in consciousness
- Inability to move one or more body parts
- Severe pain or pressure in head, neck, or back
- Tingling or numbness in extremities
- Difficulty breathing or seeing
- Heavy bleeding, bruising, or deformity of the head or spine
- Blood or fluid in the nose or ears
- Bruising behind the ear
- “Raccoon” eyes (bruising around eyes)
- “Uneven” pupils
- Seizures
- Nausea or vomiting
- Victim found under collapsed building material or heavy debris

If the victim is exhibiting any of these signs, he or she should be treated as having a closed-head, neck, or spinal injury.
CONDUCTING HEAD-TO-TOE ASSESSMENTS (CONTINUED)

STABILIZING THE HEAD

In a disaster environment, ideal equipment is rarely available. CERT members may need to be creative by:

- Looking for materials that can be used as a backboard — a door, desktop, building materials — anything that might be available.
- Looking for items that can be used to stabilize the head on the board — towels, draperies, or clothing — by tucking them snugly on either side of the head to immobilize it.

Remember: Moving victims with suspected head, neck, or spinal injury requires sufficient victim stabilization. If the rescuer or victim is in immediate danger, however, safety is more important than any potential spinal injury and the rescuer should move the victim from the area as quickly as possible.

EXERCISE: CONDUCTING HEAD-TO-TOE ASSESSMENT

Purpose: This exercise will give you a chance to practice conducting head-to-toe assessments.

Instructions:

1. After breaking into pairs, the person on the right will be the victim.

2. The rescuer will conduct a head-to-toe assessment following the previously demonstrated procedure. Repeat.

3. After making two observed head-to-toe assessments, the victim and the rescuer swap roles.
TREATING BURNS

As always, the first step in treating burns is to conduct a thorough sizeup.

A few examples of burn-related sizeup questions to ask are:

- What caused the burn?
- Is the danger still present?
- When did the burning cease?

The objectives of first aid treatment for burns are to:

- Cool the burned area
- Cover with a sterile cloth to reduce the risk of infection (by keeping fluids in and germs out)

Burns may be caused by heat, chemicals, electrical current, or radiation. The severity of a burn depends on the:

- Temperature of the burning agent
- Period of time that the victim was exposed
- Area of the body that was affected
- Size of the area burned
- Depth of the burn

BURN CLASSIFICATIONS

The skin has three layers:

- The epidermis, or outer layer of skin, contains nerve endings and is penetrated by hairs.
- The dermis, or middle layer of skin, contains blood vessels, oil glands, hair follicles, and sweat glands.
- The subcutaneous layer, or innermost layer, contains blood vessels and overlies the muscles.

Depending on the severity, burns may affect all three layers of skin.
## TREATING BURNS (CONTINUED)

### BURN CLASSIFICATION

<table>
<thead>
<tr>
<th>Classification</th>
<th>Skin Layers Affected</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial</td>
<td>- Epidermis</td>
<td>- Reddened, dry skin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Swelling (possible)</td>
</tr>
<tr>
<td>Partial Thickness</td>
<td>- Epidermis</td>
<td>- Reddened, blistered skin</td>
</tr>
<tr>
<td></td>
<td>- Partial destruction of dermis</td>
<td>- Wet appearance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Swelling (possible)</td>
</tr>
<tr>
<td>Full Thickness</td>
<td>- Complete destruction of epidermis and dermis</td>
<td>- Whitened, leathery, or charred (brown or black)</td>
</tr>
<tr>
<td></td>
<td>- Possible subcutaneous damage (destroys all layers of skin and some or all underlying structures)</td>
<td>- Painful or relatively painless</td>
</tr>
</tbody>
</table>
LIST OF GUIDELINES FOR TREATING BURNS

- Remove the victim from the burning source. Put out any flames and remove smoldering clothing unless it is stuck to the skin.

- Cool skin or clothing, if they are still hot, by immersing them in cool water for not more than 1 minute or covering with clean compresses that have been soaked in cool water and wrung out. Cooling sources include water from the bathroom or kitchen; garden hose; and soaked towels, sheets, or other cloths. Treat all victims of full thickness burns for shock.

Infants, young children, and older persons, and persons with severe burns, are more susceptible to hypothermia. Therefore, rescuers should use caution when applying cool dressings on such persons. A rule of thumb is do not cool more than 15% of the body surface area (the size of one arm) at once, to reduce the chances of hypothermia.

- Cover loosely with dry, sterile dressings to keep air out, reduce pain, and prevent infection.

- Wrap fingers and toes loosely and individually when treating severe burns to the hands and feet.

- Loosen clothing near the affected area. Remove jewelry if necessary, taking care to document what was removed, when, and to whom it was given.

- Elevate burned extremities higher than the heart.

- Do not use ice. Ice causes vessel constriction.

- Do not apply antiseptics, ointments, or other remedies.

- Do not remove shreds of tissue, break blisters, or remove adhered particles of clothing. (Cut burned-in clothing around the burn.)
TREATING BURNS (CONTINUED)

DOS AND DON’TS OF BURN TREATMENT

When treating a burn victim, DO:

- Cool skin or clothing if they are still hot.
- Cover loosely with dry, sterile dressings to keep air out, reduce pain, and prevent infection.
- Elevate burned extremities higher than the heart.

When treating a burn victim:

- **Do NOT** use ice. Ice causes vessel constriction.
- **Do NOT** apply antiseptics, ointments, or other remedies.
- **Do NOT** remove shreds of tissue, break blisters, or remove adhered particles of clothing. (Cut burned-in clothing around the burn.)

Infants, young children, and older persons, and persons with severe burns, are more susceptible to hypothermia. Therefore, rescuers should use caution when applying cool dressings on such persons. A rule of thumb is do not cool more than 15% of the body surface area (the size of one arm) at once, to prevent hypothermia.

GENERAL GUIDELINES FOR TREATING CHEMICAL AND INHALATION BURNS

Chemical and inhalation burns vary from traditional heat-related burns in their origin and treatment. Keep in mind that suspicion of either chemical or inhalation burns elevates the victim’s status to “I.”
TREATING BURNS (CONTINUED)

GUIDELINES FOR TREATING CHEMICAL BURNS

Unlike more traditional burns, chemical burns do not result from extreme heat, and therefore treatment differs greatly.

Chemical burns are not always obvious. You should consider chemical burns as a possibility if the victim’s skin is burning and there is no sign of a fire. If chemical burns are suspected:

1. Protect yourself from contact with the substance. Use your protective gear — especially goggles, mask, and gloves.

2. Ensure that any affected clothing or jewelry is removed.

3. If the irritant is dry, gently brush away as much as possible. Always brush away from the eyes and away from the victim and you.

4. Use lots of cool running water to flush the chemical from the skin for 15 minutes. The running water will dilute the chemical fast enough to prevent the injury from getting worse.

5. Apply cool, wet compress to relieve pain.

6. Cover the wound very loosely with a dry, sterile or clean cloth so that the cloth will not stick to the wound.

7. Treat for shock if appropriate.

GUIDELINES FOR TREATING INHALATION BURNS

Remember that 60 to 80% of fire fatalities are the result of smoke inhalation. Whenever fire and/or smoke is present, CERT members should assess victims for signs and symptoms of smoke inhalation. These are indicators that an inhalation burn is present:

- Sudden loss of consciousness
- Evidence of respiratory distress or upper airway obstruction
- Soot around the mouth or nose
- Singed facial hair
- Burns around the face or neck
GUIDELINES FOR TREATING INHALATION BURNS (CONTINUED)

The patient may not present these signs and symptoms until hours (sometimes up to a full 24 hours) after the injury occurred, and such symptoms may be overlooked when treating more obvious signs of trauma.

Smoke inhalation is the number one fire-related cause of death. If CERT members have reason to suspect smoke inhalation, be sure the airway is maintained, and alert a medical professional as soon as possible.

WOUND CARE

The main treatment for wounds includes:

- Control bleeding
- Clean the wound
- Apply dressing and bandage

Treatment for controlling bleeding was covered in Unit 3. The focus of this section is on cleaning and bandaging, which will help to prevent secondary infection.

CLEANING AND BANDAGING WOUNDS

Wounds should be cleaned by irrigating with clean, room temperature water.

NEVER use hydrogen peroxide to irrigate the wound.

You should not scrub the wound. A bulb syringe is useful for irrigating wounds. In a disaster, a turkey baster may also be useful.

When the wound is thoroughly cleaned, you will need to apply a dressing and bandage to help keep it clean and control bleeding.

There is a difference between a dressing and a bandage:

- A dressing is applied directly to the wound. Whenever possible, a dressing should be sterile.
- A bandage holds the dressing in place.

If a wound is still bleeding, the bandage should place enough pressure on the wound to help control bleeding without interfering with circulation.
RULES OF DRESSING

You should follow these rules:

1. If there is active bleeding (i.e., if the dressing is soaked with blood), redress over the existing dressing and maintain pressure and elevation to control bleeding.

2. In the absence of active bleeding, remove the dressings, flush the wound, and then check for signs of infection at least every 4 to 6 hours.

Signs of possible infection include:
- Swelling around the wound site
- Discoloration
- Discharge from the wound
- Red striations from the wound site

If necessary and based on reassessment and signs of infection, change the treatment priority (e.g., from Delayed to Immediate).

AMPUTATIONS

The main treatments for an amputation (the traumatic severing of a limb or other body part) are to:
- Control bleeding
- Treat shock

When the severed body part can be located, CERT members should:
- Save tissue parts, wrapped in clean material and placed in a plastic bag, if available. Label them with the date, time, and victim’s name.
- Keep the tissue parts cool, but NOT in direct contact with ice
- Keep the severed part with the victim
WOUND CARE (CONTINUED)

IMPALLED OBJECTS

Sometimes, you may also encounter some victims who have foreign objects lodged in their bodies — usually as the result of flying debris during the disaster.

When a foreign object is impaled in a patient’s body, you should:

- Immobilize the affected body part
- **Not** attempt to move or remove the object, unless it is obstructing the airway
- Try to control bleeding at the entrance wound without placing undue pressure on the foreign object
- Clean and dress the wound making sure to stabilize the impaled object. Wrap bulky dressings around the object to keep it from moving.

TREATING FRACTURES, DISLOCATIONS, SPRAINS, AND STRAINS

The objective when treating a suspected fracture, sprain, or strain is to immobilize the injury and the joints immediately above and below the injury site.

Because it is difficult to distinguish among fractures, sprains, or strains, if uncertain of the type of injury, CERT members should treat the injury as a fracture.

FRACTURES

A fracture is a complete break, a chip, or a crack in a bone. There are several types of fractures.

- A **closed fracture** is a broken bone with no associated wound. First aid treatment for closed fractures may require only splinting.
- An **open fracture** is a broken bone with some kind of wound that allows contaminants to enter into or around the fracture site.
Closed and Open Fractures

Closed Fracture
Closed Fracture in which the fracture does not puncture the skin.

Open Fracture
Open Fracture in which the bone protrudes through the skin.
TREATING FRACTURES, DISLOCATIONS, SPRAINS, AND STRAINS (CONTINUED)

TREATING AN OPEN FRACTURE

Open fractures are more dangerous than closed fractures because they pose a significant risk of severe bleeding and infection. Therefore, they are a higher priority and need to be checked more frequently.

When treating an open fracture:
• Do not draw the exposed bone ends back into the tissue.
• Do not irrigate the wound.

You should:
• Cover the wound with a sterile dressing
• Splint the fracture without disturbing the wound
• Place a moist 4 by 4-inch dressing over the bone end to keep it from drying out

If the limb is angled, then there is a displaced fracture. Displaced fractures may be described by the degree of displacement of the bone fragments.

Nondisplaced fractures are difficult to identify, with the main signs being pain and swelling. You should treat a suspected fracture as a fracture until professional treatment is available.
Displaced and Nondisplaced Fractures

**Nondisplaced Fracture**
Nondisplaced Fracture in which the fractured bone remains aligned.

**Displaced Fracture**
Displaced Fracture in which the fractured bone is no longer aligned.
TREATING FRACTURES, DISLOCATIONS, SPRAINS AND STRAINS (CONTINUED)

DISLOCATIONS

Dislocations are another common injury in emergencies.

A dislocation is an injury to the ligaments around a joint that is so severe that it permits a separation of the bone from its normal position in a joint.

The signs of a dislocation are similar to those of a fracture, and a suspected dislocation should be treated like a fracture.

If dislocation is suspected, be sure to assess PMS (Pulse, Movement, Sensation) in the affected limb before and after splinting/immobilization. If PMS is compromised, the patient’s treatment priority is elevated to “I.”

You should not try to relocate a suspected dislocation. You should immobilize the joint until professional medical help is available.

SPRAINS AND STRAINS

A sprain involves a stretching or tearing of ligaments at a joint and is usually caused by stretching or extending the joint beyond its normal limits.

A sprain is considered a partial dislocation, although the bone either remains in place or is able to fall back into place after the injury.

The most common signs of a sprain are:

- Tenderness at the site of the injury
- Swelling and/or bruising
- Restricted use or loss of use

The signs of a sprain are similar to those of a nondisplaced fracture. Therefore, you should not try to treat the injury other than by immobilization and elevation.

A strain involves a stretching and/or tearing of muscles or tendons. Strains most often involve the muscles in the neck, back, thigh, or calf.

In some cases, strains may be difficult to distinguish from sprains or fractures. Whether an injury is a strain, sprain, or fracture, treat the injury as if it is a fracture.
TREATING FRACTURES, DISLOCATIONS, SPRAINS AND STRAINS (CONTINUED)

SPLINTING

Splinting is the most common procedure for immobilizing an injury.

Cardboard is the material typically used for makeshift splints but a variety of materials can be used, including:

- **Soft materials.** Towels, blankets, or pillows, tied with bandaging materials or soft cloths

- **Rigid materials.** A board, metal strip, folded magazine or newspaper, or other rigid item

Anatomical splints may also be created by securing a fractured bone to an adjacent unfractured bone. Anatomical splints are usually reserved for fingers and toes, but, in an emergency, legs may also be splinted together.

Soft materials should be used to fill the gap between the splinting material and the body part.

With this type of injury, there will be swelling. Remove restrictive clothing, shoes, and jewelry when necessary to prevent these items from acting as unintended tourniquets.
**Splint Illustrations**

*Cardboard Splint*

Cardboard Splint in which the edges of the cardboard are turned up to form a “mold” in which the injured limb can rest.

*Splinting Using a Towel*

Splinting using a towel, in which the towel is rolled up and wrapped around the limb, then tied in place.

*Pillow splint*

Pillow splint, in which the pillow is wrapped around the limb and tied.
Anatomical Splint

Anatomical splint in which the injured leg is tied at intervals to the non-injured leg, using a blanket as padding between the legs.
TREATING FRACTURES, DISLOCATIONS, SPIRNS AND STRAINS (CONTINUED)

EXERCISE: SPLINTING

Purpose: This exercise will provide you with a chance to practice your splinting techniques.

Instructions:

1. Break down into pairs of two. One person will be the rescuer, the other will be the victim.

2. The rescuer will place a splint on the victim’s upper arm, and then one on the victim’s lower leg.

3. After several observed attempts at splinting, the rescuer and the victim will swap roles.

NASAL INJURIES

Bleeding from the nose can have several causes. Bleeding from the nose can be caused by:

- Blunt force to the nose
- Skull fracture
- Nontrauma-related conditions such as sinus infections, high blood pressure, and bleeding disorders

A large blood loss from a nosebleed can lead to shock. Actual blood loss may not be evident because the victim will swallow some amount of blood. Those who have swallowed large amounts of blood may become nauseated and vomit.

These are methods for controlling nasal bleeding:

- Pinch the nostrils together
- Put pressure on the upper lip just under the nose
NASAL INJURIES (CONTINUED)

While treating for nosebleeds, you should:

- Have the victim sit with the head slightly forward so that blood trickling down the throat will not be breathed into the lungs. Do not put the head back.
- Ensure that the victim’s airway remains open.
- Keep the victim quiet. Anxiety will increase blood flow.

TREATING COLD-RELATED INJURIES

Cold-related injuries include:

- **Hypothermia**, which is a condition that occurs when the body’s temperature drops below normal.
- **Frostbite**, which occurs when extreme cold shuts down blood flow to extremities, causing tissue death.

**HYPOTHERMIA**

Hypothermia may be caused by exposure to cold air or water or by inadequate food combined with inadequate clothing and/or heat, especially in older people.

The primary signs and symptoms of hypothermia are:

- A body temperature of 95° F (37° C) or lower.
- Redness or blueness of the skin.
- Numbness accompanied by shivering.

In later stages, hypothermia will be accompanied by:

- Slurred speech.
- Unpredictable behavior.
- Listlessness.
TREATING COLD-RELATED INJURIES (CONTINUED)

Because hypothermia can set in within only a few minutes, you should treat victims who have been rescued from cold air or water environments.

- Remove wet clothing.
- Wrap the victim in a blanket or sleeping bag and cover the head and neck.
- Protect the victim against the weather.
- Provide warm, sweet drinks and food to conscious victims. Do not offer alcohol.
- Do not attempt to use massage to warm affected body parts.
- Place an unconscious victim in the recovery position:

1. Place the victim’s arm that is nearest to you at a right angle against the ground, with the palm facing up.

2. Move the victim’s other arm across his or her chest and neck, with the back of the victim’s hand resting against his or her cheek.

3. Grab a hold of the knee furthest from you and pull it up until the knee is bent and the foot is flat on the floor.

4. Pull the knee toward you and over the victim’s body while holding the victim’s hand in place against his or her cheek.

5. Position the victim’s leg at a right angle against the floor so that the victim is lying on his or her side.

- If the victim is conscious, place him or her in a warm bath.
TREATING COLD-RELATED INJURIES (CONTINUED)

HYPOTHERMIA (CONTINUED)

Do not allow the victim to walk around even when he or she appears to be fully recovered. If the victim must be moved outdoors, cover the victim’s head and face.

FROSTBITE

A person’s blood vessels constrict in cold weather in an effort to preserve body heat. In extreme cold, the body will further constrict blood vessels in the extremities in an effort to shunt blood toward the core organs (heart, lungs, intestines, etc.). The combination of inadequate circulation and extreme temperatures will cause tissue in these extremities to freeze, and in some cases, tissue death will result. Frostbite is most common in the hands, nose, ears, and feet.

There are several key signs and symptoms of frostbite:

- Skin discoloration (red, white, purple, black)
- Burning or tingling sensation, at times not localized to the injury site
- Partial or complete numbness

A patient suffering from frostbite must be warmed slowly! Thawing the frozen extremity too rapidly can cause chilled blood to flow to the heart, shocking and potentially stopping it.

- Immerse injured area in warm (NOT hot) water, approximately 107.6°F.
- Do NOT allow the body part to re-freeze as this will exacerbate the injury.
- Do NOT attempt to use massage to warm body parts.

Wrap affected body parts in dry, sterile dressing. Again, it is vital this task be completed carefully. Frostbite results in the formation of ice crystals in the tissue; rubbing could potentially cause a great deal of damage!
TREATING HEAT-RELATED INJURIES

There are several types of heat-related injuries that you may encounter in a disaster scenario:

- **Heat cramps** are muscle spasms brought on by over-exertion in extreme heat.

- **Heat exhaustion** occurs when an individual exercises or works in extreme heat, resulting in loss of body fluids through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a mild form of shock.

- **Heat stroke** is life-threatening. The victim’s temperature control system shuts down, and body temperature can rise so high that brain damage and death may result.

**HEAT EXHAUSTION**

The symptoms of heat exhaustion are:

- Cool, moist, pale, or flushed skin

- Heavy sweating

- Headache

- Nausea or vomiting

- Dizziness

- Exhaustion

A patient suffering heat exhaustion will have a near normal body temperature. If left untreated, heat exhaustion will develop into heat stroke.
TREATING HEAT-RELATED INJURIES (CONTINUED)

HEAT STROKE
Heat stroke is characterized by some or all of the following symptoms:

- Hot, red skin
- Lack of perspiration
- Changes in consciousness
- Rapid, weak pulse and rapid, shallow breathing

In a heat stroke victim, body temperature can be very high — as high as 105º F. If an individual suffering from heat stroke is not treated, death can result.

TREATMENT

Treatment is similar for both heat exhaustion and heat stroke.

1. Take the victim out of the heat and place in a cool environment.

2. Cool the body slowly with cool, wet towels or sheets. If possible, put the victim in a cool bath.

3. Have the victim drink water, SLOWLY, at the rate of approximately half a glass of water every 15 minutes. Consuming too much water too quickly will cause nausea and vomiting in a victim of heat sickness.

4. If the victim is experiencing vomiting, cramping, or is losing consciousness, DO NOT administer food or drink. Alert a medical professional as soon as possible, and keep a close watch on the individual until professional help is available.
Bites and Stings

In a disaster environment, everything is shaken from normalcy, including insects and animals. In this time of chaos, insect bites and stings may be more common than is typical as these creatures, like people, are under additional stress.

When conducting a head-to-toe assessment, you should look for signs of insect bites and stings. The specific symptoms vary depending on the type of creature, but, generally, bites and stings will be accompanied by redness and itching, tingling or burning at the site of the injury, and often a welt on the skin at the site.

Treatment for insect bites and stings follows these steps:

1. Remove the stinger if still present by scraping the edge of a credit card or other stiff, straight-edged object across the stinger. Do not use tweezers; these may squeeze the venom sac and increase the amount of venom released.
2. Wash the site thoroughly with soap and water.
3. Place ice (wrapped in a washcloth) on the site of the sting for 10 minutes and then off for 10 minutes. Repeat this process.

You may help the victim take his or her own allergy medicine (Benadryl, etc.), but you may NOT dispense medications.

Bites and Stings and Allergic Reactions

The greatest concern with any insect bite or sting is a severe allergic reaction, or anaphylaxis. Anaphylaxis occurs when an allergic reaction becomes so severe that the airway is compromised. If you suspect anaphylaxis:

1. Check airway and breathing.
2. Calm the individual.
3. Remove constrictive clothing and jewelry as the body often swells in response to the allergen.
4. If possible, find and help administer a victim’s Epi-pen. Many severe allergy sufferers carry one at all times.
   a. DO NOT administer medicine aside from the Epi-pen. This includes pain relievers, allergy medicine, etc.
5. Watch for signs of shock and treat appropriately.
UNIT SUMMARY

To safeguard public health, take measures to maintain proper hygiene and sanitation, and purify water if necessary. All public health measures should be planned in advance and practiced during exercises.

- Disaster medical operations include five functions:
  - Triage
  - Treatment
  - Transport
  - Morgue
  - Supply

- Treatment areas must be established as soon as casualties are confirmed. Treatment areas should be:
  - In a safe area that is close to, but uphill, upwind, and, if possible, upstream from the hazard area
  - Accessible by transportation vehicles
  - Expandable

Depending on the circumstances, a CERT may establish a central medical treatment location and/or treatment locations at incident sites where many victims have been injured.

- Head-to-toe assessments should be verbal and hands-on. Always conduct head-to-toe assessments in the same way — beginning with the head and moving toward the feet. If injuries to the head, neck, or spine are suspected, the main objective is to not cause additional injury. Use in-line stabilization and a backboard if the victim must be moved.

- Burns are classified as superficial, partial thickness, or full thickness depending on severity and the depth of skin layers involved. Treatment for burns involves removing the source of the burn, cooling the burn, and covering it. For full thickness burns, always treat for shock.
UNIT SUMMARY (CONTINUED)

- The main first aid treatment for wounds consists of:
  - Controlling bleeding
  - Cleaning
  - Dressing and bandaging

In the absence of active bleeding, dressings must be removed and the wound checked for infection at least every 4 to 6 hours. If there is active bleeding, a new dressing should be placed over the existing dressing.

- Fractures, dislocations, sprains, and strains may have similar signs. Treat all suspected fractures, sprains, and strains by immobilizing the affected area using a splint.

- The key to treatment of cold-related injuries such as hypothermia and frostbite is to warm the victim slowly.

- Anaphylaxis is the most critical concern when an insect bite is suspected. Know how to use an Epi-pen and make sure to monitor the victim’s airway until professional help arrives.

HOMEWORK ASSIGNMENT

Read and become familiar with the unit that will be covered in the next session.

Try practicing a rapid head-to-toe assessment on a friend or family member. Don’t forget to document!
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